

## Refine Search

### Search Results -

Terms	Documents
L3 and copper	5

Database:

US Pre-Grant Publication Full-Text Database  
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US OCR Full-Text Database  
EPO Abstracts Database  
JPO Abstracts Database  
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IBM Technical Disclosure Bulletins

Search:

L4

Refine Search

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### Search History

DATE: Thursday, March 10, 2005   [Printable Copy](#)   [Create Case](#)

Set Name Query  
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Hit Count Set Name  
result set

*DB=USPT; PLUR=YES; OP=ADJ*

<u>L4</u>	L3 and copper	5	<u>L4</u>
<u>L3</u>	L2 and bath	17	<u>L3</u>
<u>L2</u>	ultra adj sonic adj energy	84	<u>L2</u>
<u>L1</u>	(electroless near bath) near5 (sonic adj energy)	0	<u>L1</u>

END OF SEARCH HISTORY

## Hit List

Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs
Generate OACS				

Search Results - Record(s) 1 through 5 of 5 returned.

☐ 1. Document ID: US 6846725 B2

L4: Entry 1 of 5

File: USPT

Jan 25, 2005

US-PAT-NO: 6846725

DOCUMENT-IDENTIFIER: US 6846725 B2

TITLE: Wafer-level package for micro-electro-mechanical systems

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw D
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☐ 2. Document ID: US 6447374 B1

L4: Entry 2 of 5

File: USPT

Sep 10, 2002

US-PAT-NO: 6447374

DOCUMENT-IDENTIFIER: US 6447374 B1

**\*\* See image for Certificate of Correction \*\***

TITLE: Chemical mechanical planarization system

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw D
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☐ 3. Document ID: US 4755270 A

L4: Entry 3 of 5

File: USPT

Jul 5, 1988

US-PAT-NO: 4755270

DOCUMENT-IDENTIFIER: US 4755270 A

TITLE: Method of processing solutions

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KMC	Draw D
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☐ 4. Document ID: US 4360706 A

L4: Entry 4 of 5

File: USPT

Nov 23, 1982

US-PAT-NO: 4360706

DOCUMENT-IDENTIFIER: US 4360706 A

TITLE: Electric cables of reduced micro-voids in the extruded insulation

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	MMG	Drawings
------	-------	----------	-------	--------	----------------	------	-----------	--	--	--------	-----	----------

☐ 5. Document ID: US 4259281 A

L4: Entry 5 of 5

File: USPT

Mar 31, 1981

US-PAT-NO: 4259281

DOCUMENT-IDENTIFIER: US 4259281 A

**\*\* See image for Certificate of Correction \*\***

TITLE: Process for reducing micro-voids in the extruded insulation of electric cables

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	MMG	Drawings
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Clear

Generate Collection

Print

Fwd Refs

Bkwd Refs

Generate OACS

Terms	Documents
L3 and copper	5

Display Format: TI

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[Previous Page](#)[Next Page](#)[Go to Doc#](#)

## Refine Search

### Search Results -

Terms	Documents
plating near9 (sonic)	8

Database:

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Search:

L5

Refine Search

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**Set Name Query**  
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<u>L5</u>	plating near9 (sonic)	8	<u>L5</u>
<u>L4</u>	L3 and copper	5	<u>L4</u>
<u>L3</u>	L2 and bath	17	<u>L3</u>
<u>L2</u>	ultra adj sonic adj energy	84	<u>L2</u>
<u>L1</u>	(electroless near bath) near5 (sonic adj energy)	0	<u>L1</u>

END OF SEARCH HISTORY

## Hit List

Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs
Generate OACS				

Search Results - Record(s) 1 through 8 of 8 returned.

☐ 1. Document ID: US 6797135 B2

L5: Entry 1 of 8

File: USPT

Sep 28, 2004

US-PAT-NO: 6797135

DOCUMENT-IDENTIFIER: US 6797135 B2

TITLE: Electroplating apparatus

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	Keywords	Drawings
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☐ 2. Document ID: US 6726964 B1

L5: Entry 2 of 8

File: USPT

Apr 27, 2004

US-PAT-NO: 6726964

DOCUMENT-IDENTIFIER: US 6726964 B1

TITLE: Ultrasonic process for autocatalytic deposition of metal on microparticulate

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	Keywords	Drawings
------	-------	----------	-------	--------	----------------	------	-----------	--	--	--------	----------	----------

☐ 3. Document ID: US 6626468 B2

L5: Entry 3 of 8

File: USPT

Sep 30, 2003

US-PAT-NO: 6626468

DOCUMENT-IDENTIFIER: US 6626468 B2

TITLE: Pipe joint, its manufacturing method, and fluid device using the same

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	Keywords	Drawings
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☐ 4. Document ID: US 6471845 B1

L5: Entry 4 of 8

File: USPT

Oct 29, 2002

US-PAT-NO: 6471845

DOCUMENT-IDENTIFIER: US 6471845 B1

TITLE: Method of controlling chemical bath composition in a manufacturing environment

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw D
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☐ 5. Document ID: US 6372116 B1

L5: Entry 5 of 8

File: USPT

Apr 16, 2002

US-PAT-NO: 6372116

DOCUMENT-IDENTIFIER: US 6372116 B1

TITLE: Method of forming a conductive layer and an electroplating apparatus thereof

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw D
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☐ 6. Document ID: US 5442229 A

L5: Entry 6 of 8

File: USPT

Aug 15, 1995

US-PAT-NO: 5442229

DOCUMENT-IDENTIFIER: US 5442229 A

TITLE: Metal lead-film carrier assembly having a plurality of film carriers, and film carrier-semiconductor chip assembly and semiconductor device containing such metal lead-film carrier assembly

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw D
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☐ 7. Document ID: US 4467154 A

L5: Entry 7 of 8

File: USPT

Aug 21, 1984

US-PAT-NO: 4467154

DOCUMENT-IDENTIFIER: US 4467154 A

TITLE: Gravity switch and method of making same

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWIC	Draw D
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☐ 8. Document ID: US 3969544 A

L5: Entry 8 of 8

File: USPT

Jul 13, 1976

US-PAT-NO: 3969544

DOCUMENT-IDENTIFIER: US 3969544 A

TITLE: Method for plating metallic workpieces, particularly aluminum

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	IMC	Unsub
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Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs	Generate OACS
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Terms	Documents
plating near9 (sonic)	8

**Display Format:**

[Previous Page](#)   [Next Page](#)   [Go to Doc#](#)

## Hit List

Search Results - Record(s) 1 through 8 of 8 returned.

☐ 1. Document ID: US 6797135 B2

L5: Entry 1 of 8

File: USPT

Sep 28, 2004

US-PAT-NO: 6797135

DOCUMENT-IDENTIFIER: US 6797135 B2

TITLE: Electroplating apparatus

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D
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☐ 2. Document ID: US 6726964 B1

L5: Entry 2 of 8

File: USPT

Apr 27, 2004

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☐ 3. Document ID: US 6626468 B2

L5: Entry 3 of 8

File: USPT

Sep 30, 2003

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Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D
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L5: Entry 5 of 8

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Apr 16, 2002

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☐ 6. Document ID: US 5442229 A

L5: Entry 6 of 8

File: USPT

Aug 15, 1995

US-PAT-NO: 5442229

DOCUMENT-IDENTIFIER: US 5442229 A

TITLE: Metal lead-film carrier assembly having a plurality of film carriers, and film carrier-semiconductor chip assembly and semiconductor device containing such metal lead-film carrier assembly

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D
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☐ 7. Document ID: US 4467154 A

L5: Entry 7 of 8

File: USPT

Aug 21, 1984

US-PAT-NO: 4467154

DOCUMENT-IDENTIFIER: US 4467154 A

TITLE: Gravity switch and method of making same

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw D
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☐ 8. Document ID: US 3969544 A

L5: Entry 8 of 8

File: USPT

Jul 13, 1976

US-PAT-NO: 3969544

DOCUMENT-IDENTIFIER: US 3969544 A

TITLE: Method for plating metallic workpieces, particularly aluminum

Full	Title	Creation	Front	Review	Classification	Date	Reference			Claims	PMC	Draw
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Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs	Generate OACS
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Terms	Documents
plating near9 (sonic)	8

Display Format:

[Previous Page](#)   [Next Page](#)   [Go to Doc#](#)

## Hit List

Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs
Generate OACS				

Search Results - Record(s) 1 through 6 of 6 returned.

☐ 1. Document ID: US 6835331 B2

L15: Entry 1 of 6

File: USPT

Dec 28, 2004

US-PAT-NO: 6835331

DOCUMENT-IDENTIFIER: US 6835331 B2

TITLE: Conductive composition

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw D
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☐ 2. Document ID: US 6680081 B2

L15: Entry 2 of 6

File: USPT

Jan 20, 2004

US-PAT-NO: 6680081

DOCUMENT-IDENTIFIER: US 6680081 B2

TITLE: Conductive powder and making process

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw D
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☐ 3. Document ID: US 6673533 B1

L15: Entry 3 of 6

File: USPT

Jan 6, 2004

US-PAT-NO: 6673533

DOCUMENT-IDENTIFIER: US 6673533 B1

TITLE: Multi-array multi-specific electrochemiluminescence testing

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw D
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☐ 4. Document ID: US 6485831 B1

L15: Entry 4 of 6

File: USPT

Nov 26, 2002

US-PAT-NO: 6485831

DOCUMENT-IDENTIFIER: US 6485831 B1

TITLE: Conductive powder and making process

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWD	Draw D
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☐ 5. Document ID: US 6165912 A

L15: Entry 5 of 6

File: USPT

Dec 26, 2000

US-PAT-NO: 6165912

DOCUMENT-IDENTIFIER: US 6165912 A

TITLE: Electroless metal deposition of electronic components in an enclosable vessel

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWD	Draw D
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☐ 6. Document ID: US 4529451 A

L15: Entry 6 of 6

File: USPT

Jul 16, 1985

US-PAT-NO: 4529451

DOCUMENT-IDENTIFIER: US 4529451 A

TITLE: Zinc phosphate coated metal and process of producing same

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWD	Draw D
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Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs	Generate OACS
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Terms	Documents
plating and cobalt and (sonic near3 energy)	6

Display Format: TI

Change Format

[Previous Page](#)[Next Page](#)[Go to Doc#](#)

## Hit List

Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs
Generate OACS				

Search Results - Record(s) 1 through 1 of 1 returned.

☐ 1. Document ID: US 6165912 A

L16: Entry 1 of 1

File: USPT

Dec 26, 2000

US-PAT-NO: 6165912

DOCUMENT-IDENTIFIER: US 6165912 A

TITLE: Electroless metal deposition of electronic components in an enclosable vessel

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	Index	Drawings
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Clear	Generate Collection	Print	Fwd Refs	Bkwd Refs	Generate OACS
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Terms	Documents
L15 and rinsing	1

Display Format:

[Previous Page](#)

[Next Page](#)

[Go to Doc#](#)

[First Hit](#) [Fwd Refs](#)[Previous Doc](#)[Next Doc](#)[Go to Doc#](#)**End of Result Set**

Generate Collection

Print

L16: Entry 1 of 1

File: USPT

Dec 26, 2000

US-PAT-NO: 6165912

DOCUMENT-IDENTIFIER: US 6165912 A

TITLE: Electroless metal deposition of electronic components in an enclosable vessel

DATE-ISSUED: December 26, 2000

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
McConnell; Christopher F.	Berwyn	PA		
Verhaverbeke; Steven	Radnor	PA		

US-CL-CURRENT: 438/758; 257/E21.174, 427/123, 427/125, 427/304, 427/305, 427/347, 427/383.1, 427/437, 427/438, 427/443.1, 427/560, 427/601, 427/99.1, 427/99.5, 438/678

## CLAIMS:

What is claimed is:

1. A method of electrolessly depositing a metal onto an electronic component comprising:

(a) loading a plurality of electronic components in an enclosable single vessel;

(b) forming an activation solution comprising at least one seeding agent, wherein the activation solution is substantially free of oxygen;

(c) feeding the activation solution into the vessel, contacting the electronic components in the vessel with the activation solution for a first contact time, and removing the activation solution from the vessel, wherein the activation solution is contacted with the electronic components a single time, without reuse of the activation solution;

(d) forming a metal deposition solution comprising at least one source of metal ions, at least one reducing agent, and oxygen;

(e) feeding the metal deposition solution into the vessel and contacting the electronic components in the vessel with the metal deposition solution for a second contact time to deposit metal onto the surfaces of the electronic components, wherein the metal deposition solution is contacted with the electronic components a single time, without reuse of the metal deposition solution;

(f) exposing the electronic components to sonic energy for at least a portion of the second contact time; and

(g) removing the metal deposition solution from the vessel.

2. The method of claim 1 wherein the activation solution or the metal deposition solution, or both are formed in-line by combining at least one stream of a concentrated stored solution with a stream of deionized water to form a stream of the activation solution or the metal deposition solution that is fed into the vessel.

3. The method of claim 1 wherein the metal deposition solution is formed in-line by combining at least a stream comprising the source of metal ions, a stream comprising the reducing agent, and a stream of deionized water to form a stream of the metal deposition solution that is fed into the vessel.

4. The method of claim 3 wherein the metal deposition solution stream further comprises at least one pH adjusting additive and at least one metal complexant.

5. The method of claim 4 wherein the metal complexant and pH adjusting additive is present in the stream comprising the source of metal ions or is combined separately with the stream comprising the source of metal ions and the stream comprising the reducing agent.

6. The method of claim 1 wherein the source of metal ions provides metal ions selected from the group consisting of copper, cobalt, nickel, gold and combinations thereof.

7. The method of claim 6 wherein the metal ions are copper ions.

8. The method of claim 1 wherein the seeding agent contains at least one compound, element or ion of palladium or combinations thereof.

9. The method of claim 1 wherein the activation solution or the metal deposition solution, or both are removed from the vessel by direct displacement with another process liquid.

10. The method of claim 9 wherein the activation solution is directly displaced by the metal deposition solution.

11. The method of claim 9 wherein the activation solution is directly displaced by a rinsing liquid and the rinsing liquid is directly displaced by the metal deposition solution.

12. The method of claim 1 further comprising contacting the electronic components with a rinsing solution after contacting the electronic components with the activation solution and prior to contacting the electronic components with the metal deposition solution.

13. The method of claim 1 further comprising the step of rinsing the electronic components during or after the removal of the metal deposition solution from the vessel.

14. The method of claim 1 further comprising the step of drying the electronic

components in the vessel using a drying fluid stream.

15. The method of claim 1 wherein the electronic components are semiconductor wafers and are spaced in the vessel from about 1/2 pitch to about 1/4 pitch.

16. The method of claim 1 further comprising the step of feeding hydrochloric acid into the vessel and removing the hydrochloric acid from the vessel before contacting the electronic components with the activation solution.

17. The method of claim 1 further comprising the step of contacting the electronic components with a solution that removes oxide from the surfaces of the electronic components prior to contacting the electronic components with the activation solution.

18. The method of claim 1 wherein the contacting of the electronic components with the metal deposition solution comprises filling the vessel with the metal deposition solution, soaking the electronic components in the metal deposition solution in presence of megasonic energy, and removing the metal deposition solution from the vessel following soaking.

19. The method of claim 1 wherein the contacting of the electronic components with the activation solution comprises passing at least one vessel volume of the activation solution through the vessel and removing the activation solution through direct displacement with another process liquid.

20. The method of claim 1 wherein the oxygen is maintained at a level in the metal deposition solution ranging from about 50 ppb to about 5 ppm.

[Previous Doc](#)

[Next Doc](#)

[Go to Doc#](#)



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### Search Results -

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L15 and rinsing	1

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Search:

L16





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result set

*DB=USPT; PLUR=YES; OP=ADJ*

<u>L16</u>	L15 and rinsing	1	<u>L16</u>
<u>L15</u>	plating and cobalt and (sonic near3 energy)	6	<u>L15</u>
<u>L14</u>	L13 and sonic	7	<u>L14</u>
<u>L13</u>	L12 and (plating near6 bath)	7	<u>L13</u>
<u>L12</u>	plating and copper and (sonic near3 energy)	43	<u>L12</u>
<u>L11</u>	L10 and watts and hertz	1	<u>L11</u>
<u>L10</u>	L9 and (ultra or mega)	100	<u>L10</u>
<u>L9</u>	plating and copper and sonic	380	<u>L9</u>
<u>L8</u>	L5 and hertz	0	<u>L8</u>
<u>L7</u>	L5 and watts	0	<u>L7</u>
<u>L6</u>	L5 and watts and hertz	0	<u>L6</u>
<u>L5</u>	plating near9 (sonic)	8	<u>L5</u>
<u>L4</u>	L3 and copper	5	<u>L4</u>
<u>L3</u>	L2 and bath	17	<u>L3</u>

<u>L2</u>	ultra adj sonic adj energy	84	<u>L2</u>
<u>L1</u>	(electroless near bath) near5 (sonic adj energy)	0	<u>L1</u>

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